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ABSTRACT

An exploratory study of structured and unstructured play was conducted with a small number of severely disturbed and normal children 9 to 13 years of age. Specifically, the investigators characterized psychopathology from a cognitive-developmental perspective by focusing on the Piagetian "scheme" and its manifestation in the play and classification tasks of public school students and those in a day treatment institution. The study resulted in a preliminary list of criteria differentiating disturbed and normal subgroups. Case studies illustrated differences between the two populations in scheme intercoordination, repetition, modifiability, assimilation and accommodation, and symbolic nature. (Explanations of scheme deviations are presented through examination of problems in subject/object interactions, and clinical applications of Piagetian theory are discussed.) (RH)

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A PIAGETIAN APPROACH TO PSYCHOPATHOLOGY: SCHEME DIFFERENCES IN CHILDREN'S PLAY

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Many theorists examine psychopathology in terms of affective developmental crises, but few emphasize the importance of cognition. This descriptive study characterizes psychopathology from a cognitive developmental perspective by focusing on the Piagetian "scheme" and its manifestation in the play and classification tasks of public school students versus those in a day treatment institution. Case material illustrates differences between the two populations in scheme intercoordination, repetition, modifiability, assimilation and accommodation, and symbolic nature. Explanations of scheme deviation are presented through examination of problems in subject/object interactions. Clinical applications of Piagetian theory are discussed.

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Discussions of childhood psychosis and neurosis have traditionally focused on children's problems in affective/interpersonal development. The role of cognitive developmental dysfunction in psychopathology has only recently begun to be explored systematically outside the categories of mental retardation and organic disorders. Inspired by the Piagetian developmental model, researchers have made a number of successful attempts to describe cognitive stage deficits displayed by severely disturbed children. However, beyond documenting the fact that clinically diagnosed children tend to be developmentally delayed, the research has not yet provided the detailed descriptive data required by researchers and clinicians to render the Piagetian approach useful for both diagnosis and treatment. This paper presents an exploratory study of structured and unstructured play in a small number of severely disturbed and normal children aged 9 to 13. Using the clinical method to focus on a detailed analysis of their cognitive-behavioral schemes, we arrive at a preliminary list of criteria differentiating disturbed and normal subgroups.

Normal acquisition in the Piagetian model is characterized by the presence of age-appropriate structures and functions. Piaget refers to psychological structures as organized totalities of activities which represent the order and coherence underlying actions and experience. They thus provide the person with an organized framework which makes experience meaningful. By contrast, the functions--assimilation (the modification of the outside events in terms of existing structures) and accommodation (the modification of existing structures

in response to impinging stimulation)--are the dynamic mechanisms by which the structures are constructed and modified.

If intact structures and functions are assumed to define normal development, then it follows that psychological dysfunction should be accompanied by structural and/or functional problems in the child or in the match between the child and the environment. Existing research has supported this idea, especially in the examination of structural differences. When compared with normal peers, psychotic children reveal deficits in object permanence (Serafica 1971), symbol formation (de Ajuriaguerra et al 1969), general sensori-motor acquisitions (Rosenthal et al 1980), conservation (Marks 1972, Goldfarb and Mintz 1961, Halpern 1966, Lovell and Slater 1960), and other measures of concrete and formal operational thinking (Inhelder 1976a,b; Schmid-Kitsikis 1976; de Ajuriaguerra et al 1969). These studies, in adopting a structural approach, contribute important information about the close link between cognition and psychopathology. In doing so, however, they forcibly assume a "deficit" approach to psychopathology, maintaining that psychological disorder is synonymous with a lack of sophisticated structures. They also neglect to demonstrate how such structural deficits occur.

Authors such as Schmid-Kitsikis (1979), Cowan (1978), Inhelder (1976b) and Voyat (1980) emphasize differences in the functional mechanisms of normal and disturbed children. They describe the presence of assimilation/accommodation imbalances in clinically diagnosed children: the outside world is continually deformed by internal, subjective experience (overassimilation), or internal experience is constantly negated in order to conform to the outside world (overaccommodation). Both types of imbalance inevitably result in a failure to differentiate between inner and outer world. Other functional aberrations noted in psychotic children include dominance of static over operatively-influenced imagery, difficulties with object manipulation, little coordination of action, and considerable fluctuation between advanced and less mature levels of thought (Schmid-Kitsikis 1972, 1976). Breslow and Cowan (in press) recently demonstrated that psychotic children, who are matched with

normal children in terms of structural developmental level, show difficulties in anticipatory imaginal activities in seriation tasks. De Ajuriaguerra et al (1969) point to other functional difficulties such as avoidance of contradiction (or a refusal to "disequilibrate") and an unwillingness to reason in probabilistic terms.

The purpose of the present descriptive study is to extend our understanding of the more global functional mechanisms described in previous research by examining specific subject/object interactions and by exploring the modification of lower level structures in different situations. We have chosen to look at how the subject interacts with objects in his world at a "micro-level" by examining the modification of what Piaget terms the "scheme".

According to Piagetian theory, the scheme is the basic unit of subject/object interaction. It is the most primitive of structures and is continually modified by the functional invariants -- assimilation and accommodation. Langer (1969), in fact, refers to schemes as "functional structures". Piaget defines the scheme as an action which is repeatable in similar situations and generalizable to new situations. However, the scheme is in essence the cognitive structure allowing for the action rather than the action itself. Schemes become "coordinated" (Piaget 1963) whenever the subject wishes to reach a new goal requiring a combination of actions not previously related to one another. Coordination takes place when schemes assimilate and accommodate to each other. Another property of schemes is that they become progressively more differentiated and specialized. A global scheme, such as sucking, for example, may become specialized for the specific object being sucked.

We believe that attention to scheme structure and modification via examination of scheme structural level, intercoordination, differentiation, assimilation, and accommodation, may provide an in-depth look at how the disturbed child interacts with external objects. This strategy may help to clarify the reasons behind structural lags and instabilities in those children exhibiting

psychopathology. Since our method is purely exploratory and involves only a small sample of subjects, our purpose is primarily to generate hypotheses about scheme differences in normal and disturbed children by examining samples of free play and structured activities from individuals in these two subgroups. Schemes are investigated in three situations: a free play period, and two structured classification tasks. While the classification tasks tend to restrict the nature of the schemes used, the less structured free play task provides examples of unconstrained scheme activity. This combination of the three tasks allows us to obtain a rich sampling of types and levels of schemes in a variety of situations. Our exploratory study looks at sensori-motor type "action" schemes -- as opposed to more complex, symbolic schemes -- since these are more easily inferred from behavior and provide valuable data concerning actual subject/object interactions.

METHOD

Participants

The exploratory nature of our work lead us to begin with a qualitative analysis of the play samples of three French-speaking psychologically disturbed children who were placed in a day treatment institution in Geneva, Switzerland because they were unable to function in public schools. From this small sample of children, who ranged in age from 9-13 years, we were able to collect free play excerpts containing approximately 70 to 160 schemes in addition to detailed descriptions of their classification activities in two types of tasks.

For purposes of highlighting contrasts between disturbed and normal children, we observed play samples containing of about 30-100 schemes from eight 8-10-year-old French-speaking children in a Genevan public school. Although these children were somewhat younger than the day treatment group, their structural developmental level was found to be more advanced, as evidenced by their classification activities. What we were primarily interested in, however, were the functional aspects and the method of primitive structure construction in the play in these two subgroups, independent of the children's overall structural level.

Tasks

We chose to investigate three tasks: 1) a free play situation, 2) an imposed classification of play objects, and 3) a standard Piagetian classification task. Classification tasks were chosen as "structured" tasks, since they examine how the child characterizes relationships among objects and thus provide excellent opportunities to examine scheme intercoordination. The classification of familiar play objects (i.e. human figures, animal figures, household items) versus standard shapes (circles, squares, and triangles) allowed us to compare the individual's approach to objects which are more readily assimilable to personal schemes versus those which are "normative" (Schmid-Kitsikis 1979a) or devoid of personal meaning. Investigation of the child's behavior in familiar object vs. normative classification situations thus permitted us to assess the degree to which the child's logico-mathematical functioning -- as evidenced in classification tasks -- could be altered in assimilation-inducing situations. The entire testing situation, then allowed us to examine a variety of types and levels of schemes as the subject interacted with 1) familiar objects, which are readily subject to assimilative processes, 2) normative objects, which are relatively devoid of personal meaning, and 3) human objects -- that is, the examiner and observers.

For the free play and familiar object classification tasks, our test material consisted of different small toys and figurines. These included a dog, a crocodile, a soup kettle and cover, a ball of clay, a toy loaf of bread, a bowl, a seal, a bear, a rabbit, a spoon, a knife, a fork, a baby, a man, a woman, a bottle, a wrench, a pair of pliers, a pair of scissors, a small cardboard house, a piece of felt cloth, and a plastic mirror. For the third part of the task, traditional materials for Piagetian classification tasks were employed. These consisted of a group of cardboard shapes which varied by size (large and small), color (red, blue, and yellow), and form (triangle, square, and circle).

Procedure

All testing proceeded via the Piagetian "clinical" method and was conducted in French by a small group of four examiners including the senior author. The children were brought individually from their classrooms to a separate testing room in their school, where they were introduced to the examiner and three transcribers. After some brief discussion to establish rapport, the examiners presented the child with the group of toys listed above. No initial instructions were provided by the examiner; however, in almost all cases the children immediately picked up the toys and began to play with them. In a few cases, the child made no physical contact with the objects after several minutes. The examiner would then ask a general question such as, "What could you do with those?" which usually prompted the child to begin.

The children were permitted to play for approximately 20 minutes. During this time, the transcribers would record every action and verbalization as well as draw diagrams of play constructions. The examiner interfered little during the play period, occasionally requesting the child to state what he or she was doing. Most questions, however, were reserved for the end of the play period.

The familiar object classification followed completion of the free play activity. For this task, the examiner placed four blank pages on the table and asked the child to "put those things which go together" on each sheet. After the child completed this task, he was asked to assign a label or name the classification for each page, thereby expressing his understanding of the organizing factor involved in each classification. Next, the examiner took an object and moved it to another sheet, questioning the child as to whether the new object belonged with the others, and thus assessing the relative stability of his classification. The toys were then removed from the papers, and the child was asked to repeat the task, "but in another way". In this way, we were able to examine the flexibility of the child's thinking, as well as the extent to which classification structures were fully established.

Finally, the child was administered the traditional Piagetian classification task with the cardboard shapes described earlier. The child was again asked to form groups of "those things which go together" and later to perform the task in two other ways. As in the familiar object classification, children were asked to name their classifications and to verify whether objects could be moved from one group to another. It should be noted that participants from the school for disturbed children often did not complete the classification tasks, as they sometimes became overly anxious and were unable to continue working.

A child's action was regarded as a "scheme" if it was potentially applicable to a variety of objects and modifiable as a function of those objects. The cognitive structure allowing for the action, was not, of course, observable but inferred. Thus, activities such as "placing down", "putting next to", or "making walk" were labeled as schemes. Specific examples included placing the female doll next to the male doll, making the dog walk, spreading out the cloth on the table, putting the house on the cloth, cutting the clay, and so on. Purely verbal schemes were also noted (for example, the child stated, "The baby goes to sleep" without actually manipulating the baby) as were verbal anticipatory schemes (for example, the child stated, "I could make the baby sleep" without actually completing the action). The descriptive data which follow suggest several generalizations about the nature of the schemes in the two groups of children.

RESULTS

Systematic observation of the public school children and those in the day treatment institution yielded striking differences in the nature of the schemes of the two groups. Here we will attempt to characterize some of the most salient differences by providing brief descriptions of the children's play activities in terms of scheme characteristics. While the examples presented are anecdotal in nature and few in number, they serve as clear illustrations of how the two sets of children structure their activities and interact with the objects available to them. It is hoped that such data will provide a basis for generation of

testable hypotheses for future research. Table I summarizes our impressions of the nature of the schemes for the two sets of children. Differences seem to fall under several headings -- intercoordination, modifiability and repetition, scheme level, and assimilation and accommodation -- each of which will be considered in turn.

Insert Table 1 about here

Intercoordination

The schemes of the day treatment children differ considerably from those of the public school children in the degree to which they are intercoordinated, or united as a function of an overall goal or plan. The disturbed children's schemes appear "fragmented". Functionally, then, the schemes are not readily assimilated or accommodated to each other with the result of achieving a larger, more elaborate goal. From a structural point of view, internal combination of schemes in order to achieve new ends -- reminiscent of Piaget's sensori-motor substage 6 -- appears difficult for these children. Such scheme fragmentation seems to manifest itself in a variety of ways. In two of the three play samples, there is some initial coordination of action. However, scheme combination is minimal, and the overall construction plan is lost early on in the play:

> Jean (age 13) begins by arranging a simple house or family construction. Near the beginning of the session, however, he tries to seat the male doll on the rug. This turns out to be impossible, due to the construction of the toy. Jean's play then becomes characterized by his continual attempt to make this unbendable doll sit down. He spends almost the entire session on this activity and becomes increasingly frustrated. The examiner suggests that he try another approach, but Jean appears unable to attempt a new strategy or go on to a new activity. Finally, after much urging by the examiner, Jean tries to continue his initial construction. He consistently reverts, however, to the "make sit down" scheme. One or two simple house scenes are completed, but Jean then reattempts to bend inflexible objects such as a toy baby with no arm or leg joints, a plush bear, and a hard, plastic mirror.

Although Jean does begin with some overall plan and exhibits several examples of scheme coordination (i.e. placing the house near the rug, placing the dog in the house) in function of a larger goal (creating a house scene), the coordination process breaks down in the middle of his activity. In the play sample of another child, however, scheme intercoordination is not readily evident at all:

Anne (age 12) begins by touching all the objects and displacing them slightly. Sometimes she turns them over, but no overall construction plan is evident. When she handles the objects, she does not seem to be exploring them, but moving them randomly. She continually repeats the schemes of touching, displacing, and turning over. Occasionally, Anne puts several objects on the felt cloth, so that some sort of construction may be inferred. It is not possible, however, to ascribe a name to anything she creates, since there is no apparent theme to the conglomeration of objects. The same is true for the four paper classification task , where Anne once again appears to group the toys randomly on the sheets and is therefore unable to name her collections. She does not object when the examiner moves several objects to different papers, as she seems to have no established classification criteria. Anne's initial groupings on the traditional classification task are also random; however, with some prompting from the examiner, she is able to classify by shape and to name the subgroups.

Anne thus engages in the schemes of touching, displacing, and turning over; however, these schemes are not intercoordinated into themes, stories, or constructions. For Anne, objects in both the free play and classification tasks are not recognizably grouped in terms of their relationship to one another: she demonstrates a possible failure of what Piaget terms "logico-mathematical knowledge". Fragmentation of play is thus evident through lack of an organizing theme or activity. It may also be perpetuated, however, when the scheme content itself is of an "undoing" nature; that is, when actions involve "cutting up" or "breaking apart" rather than "putting together":

Dora (9 years) begins by cutting up bits of clay and placing them in the pot. Next, she picks up each of the tools and announces, "This crushes, this cuts, it's hard". Her one construction involves placing the dog in the house and putting the man, woman, and baby in front. She then pinches the baby with the wrench and breaks the baby's leg, exclaiming, "It's broken. How can we put it back together?" She later takes off the man's shirt and continues cutting up clay and jabbing it with the baby bottle as well as with other objects. She terminates her play period by throwing all the objects -- one at a time -- down at the examiner's feet so that he "can't move anymore". This activity involves breaking the objects as she throws them; for example, she removes the rabbit's eyes before dropping it on the floor.

As in Jean's play activity, Dora starts out with some minimal construction, but never again attempts to coordinate actions as a function of a larger goal. Eventually, she tries an "end" which involves preventing the examiner from moving. Yet, analysis at the level of the scheme reveals little experimentation and coordination in service of that end, but rather the repetition of a single ineffectual action ("throwing objects down") in attaining her goal. Her schemes

are also "undoing" in nature, since the majority of her activities concern themselves with cutting, breaking apart, or throwing away. She seems to have difficulty with acts of combination, as evidenced by her question, "How can we put it together?" which she asks after breaking the baby doll.

In contrast to the schemes of the disturbed children, the schemes of the normal children are readily assimilated or accommodated to each other for the purpose of attaining a goal. Structurally, individual schemes appear subsidiary to larger plans so that sensori-motor substage 6 acquisitions seem intact. In the following example, the child touches for the sake of exploration and construction, seemingly wondering what can be built with each toy or how each toy can be made to fit into the overall construction. In Piagetian terms, he appears to be asking the "functional" question, "How can each piece be either assimilated or accommodated to?"

> Jean-Paul (age 10) first decides to construct a farm. He is dissatisfied with the toy house because it is too big, and instead announces that he will build an apartment with a dog and a baby inside. He unfolds the felt cloth and places the dog and the baby on top of it. He then lifts up the man and states, "His father takes the dog for a walk". Next he places the woman near the cloth and comments, "This is her mother". Jean-Paul proceeds to build a complex apartment scene with a couch which he constructs out of clay. He seats the woman on the couch. Other objects are placed in the apartment which is delineated by the felt cloth. The house is put on the side of the construction and is designated as a "cabin to play in". Jean-Paul picks up the crocodile and announces that it is a "crocodile made of plush". He then goes on to narrate a story concerning a mother and a father who are with their son when a wicked witch makes all the silverware and kitchen utensils get larger.

Similar examples of immediate scheme intercoordination occur in the play periods of the other public school children tested. After examining the materials, ideas for constructions or stories are formulated, and actions are combined in the service of these formulations. This appears to be the case even if the play is not particularly rich in imaginative material. One child, Barbara (age 9), for example, appears disturbed by the testing situation, and incorporates only a limited amount of fantasy themes or constructions in her free play period. However, she does intercoordinate actions by methodically placing the tools, people,

food, and animals in separate piles with goal of classifying and combining like objects. Claudine (age 8) cuts up clay, but unlike Dora (the day treatment child described earlier) does so only for the purpose of recombining the material in the form of a tablecloth.

A related characteristic of the public school children's play is that its characters are not identified in isolation (i.e. "This is a man"), but in terms of their relationships with other members of the story (i.e. "This is her mother"). When objects are named, their use or function in the general plan is often included. Thus, a house is not just a house, but a "cabin to play in" (Jean-Paul). Other examples taken from play periods include:

> "...The bottle to feed him the baby" (Robert); "This is the man's house", "This is a scissors to cut things", and "This clay is for playing -- for making houses" (Béatrice).

In the public school group, what Piaget refers to as "reflecting abstraction" (where objects and actions are put in relationship to one another) is apparent. So, too, is the complementary process of "simple abstraction" or the extraction of knowledge of the physical properties of objects. Jean-Paul, for example, becomes cognizant of one toy's physical properties when he states, "This is a crocodile made of plush". Both types of abstraction require the recognition of interrelationships among objects and the coordination of past and present knowledge about objects. Piagetian theory maintains that both these processes are integral to the elaboration of cognitive structures; yet they are not readily observable in the fragmented play of the institutionalized children.

The day treatment children are, in fact, capable of coordinating schemes. Two out of three of this group make an initial attempt at some construction, although the process becomes fragmented early on in the play, either due to a lack of scheme intercoordination or to the "undoing" nature of scheme content. In fact, there is never an example of a highly integrated story or construction in any of the disturbed group's play samples.

The day treatment children, like those in the public school, are also able

to make some use of "tools" which require that separate actions be put in relationship to one another (for example, "cutting clay with a knife" involves "holding the knife" and "cutting the clay"). The public school children, however, use tools with greater complexity of coordination. One public school child, for example, has the man repair the house with the wrench; another has the man cut the clay with the knife. The institutionalized children combine schemes in order to use tools in only the simplest of ways. One child, for example, cuts the clay with the knife himself, but does not have a toy character complete the action. It thus appears that the play of the disturbed children differs both quantitatively and qualitatively from the normal group. Quantitatively, disturbed children show some evidence of scheme intercoordination, but this is minimal and is often found only at the beginning of the play session. Qualitatively, there appears to be differences in scheme content, with the disturbed children sometimes displaying schemes of an "undoing" nature. Further, the level of complexity of scheme intercoordination is more advanced for the public school group.

Modifiability, Specializability, and Repetition

Our observations suggest that the schemes of the group of children exhibiting psychopathology are repetitive and relatively unmodifiable or unspecializable as a function of new environmental demands. Functionally, the play of this group of children has a perseverative quality, and the continual scheme repetition may lead to mounting anxiety. While Block (1982) posits that the anxiety evident in the disequilibration process provides the motor for the formation of new structures, he also suggests that in certain cases this anxiety may exceed personal tolerance and "the individual may return, perseveratively, to assimilative efforts" (p. 291). In keeping with this perseverative repetition is a lack of experimentation with alternative means, as the child repeatedly attempts to use the same ineffectual methods to attain a single goal. Structurally, this again suggests deficits at sensori-motor stage 6.

Perhaps the best example of such repetitive functional processes may be found in the case of Jean (cited above). Jean appears unable to inhibit his "make sit down" scheme and becomes increasingly anxious and frustrated. When the experimenter finally stops the activity, Jean, visibly anxious, takes the male doll and flings it across the table, stating, "We won't use this one". When asked about the doll at the end of the play period, Jean continues to express frustration about the man who "doesn't sit down like he's supposed to".

Jean's play also exhibits an inability to accommodate his "make sit down" scheme to the properties of the real object. He thus does not sufficiently modify or specialize the "make sit down" scheme to effectively incorporate unbendable toys. For example, Jean attempts to bend an inflexible male doll, and then two other unbendable dolls -- a baby and a bear. Later on, he tries to apply the bending scheme to a hard, plastic mirror. Jean at one point attempts a new means scheme (removing the doll's pants) to attain his goal (making the doll sit down). This proves unsuccessful, though he is unable to consider other possible alternatives. He then resumes his repetitive pattern. Although he is 13 years of age, Jean's play does not fulfill structural criteria for Piaget's sensori-motor stage 6 (18 months - 2 years), which necessitates the internal coordination of schemes in order to engage in the invention of new means.

From a functional point of view, Anne, too, (also cited above) does not appear to modify or specialize schemes in terms of the materials used. All objects are turned, displaced, or touched in approximately the same manner. These three schemes are repeated over and over again, with little variation. In fact, structurally, Anne's play is reminiscent of sensori-motor secondary "circular reactions", where the infant repeats schemes because they have produced an interesting event. The difference, however, is that Anne's "circular reactions" remain circular; that is, they become dominated by repetitive activity.

Dora also continually repeats actions and has difficulty stopping her "throwing down", "breaking", and "cutting apart" schemes, despite her mounting anxiety. All of the objects, for example, are thrown down, and the activity is discontinued only when all pieces have hit the floor. The throwing down scheme, is, in fact, an ineffectual means to keep the experimenter from being able to move, and Dora appears unable to consider other alternatives. The same holds for the invention of her own classification task, which she creates at the end of the session and invites the examiner to participate in. This again appears to be an ineffectual method of taking control of the testing situation and alleviating some of her anxiety. The attempt proves unsuccessful, and because Dora experiments with no alternative means of calming herself, she leaves the room stating that she is "afraid". Thus, Dora demonstrates functional difficulties in scheme accommodation, as well as structural deficits in sensori-motor stage 6 where she has difficulty experimenting with new means in order to attain an end.

The schemes of the public school children may repeat, but do not become overly repetitive. The child can usually stop at will, and the process is not accompanied by mounting anxiety. If the external object resists the scheme, the scheme then accommodates to the object. Schemes therefore become specialized

according to the properties of objects, and functional processes are thus intact. Alternative means are also experimented with in order to attain a single goal, so that sensori-motor structural acquisitions appear stable.

> Claudine (age 8) cuts up clay in order to construct a tablecloth for a birthday party scene. When the tablecloth turns out to be too small, she attempts different methods (the means) -- such as flattening and cutting -- to make the tablecloth the correct size and shape (the end). She works assiduously, but does not repeat strategies of construction which prove unsuccessful. Late she tries to create a basket which again turns out to be too small for her purposes. She becomes frustrated, but is able to stop the task and go on to a new activity. The problems of construction appear to be subsidiary to the overall plan for the birthday party. Structurally, this is unlike the play of the institutionalized children (such as Jean), where the details of construction take precedence over the overall plan.

> Normal functional adaptation processes are witnessed in the play periods of other public school children, such as Thierry (age 9) who creates a man out of clay. Each time that the man's head or arms fall off, Thierry patiently attempts different methods of remaking them and goes on narrating his story. Often he incorporates such events into the plot of his tale, so that the general fluency will not be interrupted. For example, when the male doll falls down, Thierry states, "The man falls down and the seal helps him to get up. The man says 'Thank you'". When the man's head rolls on the floor, Thierry announces for his character, "It's a good thing I'm not losing my head" and places the clay head back on the body.

In both these instances, the child is able to deal with ineffectual methods of construction by stopping the activity or by trying out alternative methods. The new methods attempted are eventually successful because they are workable within the properties of the real object. (For example, flattening and cutting are reasonable actions to be performed on clay). In fact, Claudine is able to adapt her manner of flattening (accommodation) so that the tablecloth does not become too large or too small. Thierry demonstrates his ability to accommodate his story to include the man's loss of certain body parts. Even in an assimilative situation such as play, then, the normal children appear able to adopt an accommodative mode when the situation calls for it.

Scheme level: Symbolic vs. Sensori-Motor Nature

Piaget labeled the period of development from 0-18 months as the "Sensori-Motor" stage which itself is divided into six substages. It is characterized by the absence of symbolism, primitive notions of causality, as well as "circular

reactions" or actions which are repeated because they produce interesting results.

It is somewhat surprising that the children in the day treatment group exhibit schemes which possess a sensori-motor quality, although these children range from 9-13 years of age. First, as described in earlier sections, experimentation with new means in order to obtain a desired end is difficult for these children, so that their structural level of play does not appear to meet criteria for the 6th sensori-motor substage. Second, their schemes do not appear to occur on a symbolic level. The purely verbal scheme -- one form of symbolic activity -- is little used during their play periods. Similarly, verbal anticipatory schemes (such as stating, "I could make the baby go to sleep") are not observable in the play samples of the institutionalized children. The fact that these youngsters have difficulty setting goals in the play period may, in fact, be due to the impoverishment of symbolic schemas (inner, figurative representations of objects) and the inability to symbolize schemes (or internally imagine actions). The goal of constructing an apartment, for example, necessitates both a symbolic representation of the apartment as well as the ability to imagine sequences of actions relating to its construction. Also, for the disturbed children, schemes about the self and schemes about objects appear intertwined, so that "pretending" becomes difficult, and symbolic play is impoverished. Without the use of symbolic play to help master emotional conflict (Piaget 1944, Erikson 1963, Peller 1954), these children appear subject to increasing anxiety and fear.

> Jean's play seems tied to the here and now, and his symbolic activity is quite impoverished. He appears relatively unable to carry on purely verbal play or make use of verbal anticipatory schemes. The only time he attempts to imagine conversations between "characters" of his construction occurs when he is pressed to do so by the examiner. The tester asks him, for example, if the characters are speaking to one another, and Jean at first claims that they are not. When the examiner helps initiate a conversation, Jean responds as if he, himself, were speaking the part instead of the characters. The "pretend" conversation thus takes on a real quality and ceases to remain symbolic. In this way, there is little differentiation between the self (Jean) and the objects which he is playing with.

> Dora's schemes also appear tied to the present and lack a symbolic quality to them. There is so little distance maintained between self and object, that her play becomes fraught with emotion. For example, her session starts out with the toy dog being afraid, but finishes with her stating that she is afraid. She also makes the tools jab at objects, but later explicitly states that people are jabbing at her. While Dora engages in activities such as cutting up clay, she does not have toy characters engage in such activities, which further suggests symbolic impoverishment. Verbal and verbal-anticipatory schemes are nonexistent. (She makes verbal statements such as, "How can we put this together?" but does not verbally describe repeatable or generalizable actions). Dora's inability to make use of symbolic activity seems to make it difficult for her to resolve fears evoked by the play session. Dora also utilizes other sensori-motor reasoning processes. She believes, for example, that throwing clay at the transcriber's feet will prevent him from moving from his chair. This is reminiscent of the "efficacy" (dim sense that feelings of desire or effort control external events) characteristic of the sensori-motor stage. Finally, Dora's continual asking "What's this?" when holding up familiar objects may represent some failure of either social or logico-mathematical knowledge, further indicating the presence of lower-level reasoning processes.

Unlike the schemes of the children just described, those of the normal children more often occur on a symbolic level, thus providing some distance between self and play objects and allowing the child to prevent anxieties evoked by the material and testing situation from becoming too real. Because the normal children's schemes are not tied to the "here and now", fantasy can be used effectively and may also help in achieving mastery over anxiety. These children, unlike the disturbed individuals, not only use more language, but describe symbolic action by making use of both verbal and verbal anticipatory schemes.

> Françoise (age 9) develops a story in which a dangerous crocodile attacks a family, but is then killed by the father. Her tale thus incorporates fear and other powerful emotions, but the strong feelings are in the end resolved.

> Jean-Paul (age 10) constructs an apartment. He lifts up the male doll and states, "The father takes the dog for a walk". Next Jean-Paul takes the female doll and explains, "This is his mother". He continues to construct the house and then narrates a story concerning a mother and a father who are with their son when a wicked witch makes all the silverware and kitchen utensils get larger.

Jean-Paul's story demonstrates the rich use of fantasy exhibited by many of the public school children. He, like several of the other children tested, is also able to invent an imaginary character (the witch) which is not represented by the physical presence of any of the toys. This is indicative of the normal

child's ability to use symbolic schemes to the utmost and distance himself from the here and now.

> Béatrice (age 9) spends almost the entire play period narrating a story about a family and their care for a group of animals. She barely manipulates the materials at all, so that her play session makes almost exclusive use of verbal schemes. Also witnessed in Béatrice's play activities (as well as those of the other public school children) is the presence of verbal anticipatory schemes such as, "One could make a large house and put all the objects inside" and "One could make a large kitchen and put everything inside". Such verbal anticipatory schemes are also noted in the play of Suzanne (age 10).

Assimilation and Accommodation

In the play of the institutionalized children observed here, objects tend to assimilate to schemes more often than schemes accommodate to objects. Although play by definition is an assimilative activity, these children tend to over-assimilate. Their consistent over-assimilation leads to a distorted and not subsequently corrected view of the objects such around them. These distorted objects may include the toys as well as human objects such as the examiners.

> The most revealing example is found in the case of Dora. Dora tends to assimilate objects to her schemes rather than modify schemes in terms of the properties of objects. All the toys, for example, become objects to be thrown away. This over-assimilation also occurs with respect to the examiners, who become fear-inducing and are assimilated in such a way that the child appears to be saying, "This is an object to be afraid of" or "This is an object to be attacked".

> Both Jean and Anne exhibit an increased tendency to assimilate objects to their own schemes rather than to accommodate to objects. Jean tries to assimilate objects to his "make sit down" scheme, while Anne assimilates all objects to the schemes of touching, displacing, and turning over.

The play of the normal children, on the other hand, displays a continual interplay of assimilation and accommodation. Although assimilative activity may dominate the play, there is less distortion of people and objects due to over-assimilative processes. The public school children thus appear able to maintain a relative balance of these two processes and to keep each within an adaptive range. Although these children engage in fantasy, they rarely ignore the limits of the object in ordinary life. For Jean-Paul, the silverware and pots become magical, but they are still used for cooking. In Béatrice's story concerning

fantastic talking animals, tools are nonetheless used as tools, and people as people. Barbara's play -- limiting itself mainly to classification according to the properties of objects -- is largely accommodative; however, elements of assimilative fantasy play are also introduced when she states that the man is "walking the dog" and the female doll is "doing her hair".

Excellent examples of the interplay between assimilative and accommodative activities are evidenced in the sessions of those children who are bothered by the different sizes of the toy objects. (The silverware and tools are large in proportion to the adult dolls, which are in turn large in proportion to the baby). Jean-Paul, for example, accommodates his otherwise assimilative story to incorporte the relatively large size of the table items by introducing a witch character who makes the silverware expand.

Etiology

Piaget does not describe the etiology of developmental disorders in his theory. Nevertheless, his conception of how developmental progress normally occurs suggests three general areas in which to search for the causes of structural and functional disadvantages in scheme development: in the child; in the physical and social environment; and in the interaction between the two.

(a) Problems located primarily in the child.

It seems likely that structural delays in development have snowball effects. With each passing year, a child who does not acquire full use of symbolic schemes lags farther behind his or her age mates. The frustration itself can contribute to further delay. It also seems likely that the normally self-regulating assimilation/-accommodation balancing mechanism may be malfunctioning in the children we have described above. The malfunction would necessarily impede development and distort the child's sensori-motor schemes.

(b) Problems located primarily in the environment.

During the process of simple abstraction, the child gains knowledge about the physical properties of objects by determining what schemes (bending, throwing,

breaking etc.) may be reasonably applied to them. There is evidence from the growing field of social cognition that similar processes occur in the child's coming to understand the self and the social world (e.g. Damon 1982; Turiel 1978). If the objects or the people in the child's world do not react, or if they react non-contingently (e.g. Watson 1972), the child may fail to develop normal symbolic schemes. As in Seligman's (1974) learned helplessness model of depression, some children faced with a non-responsive environment or one over which they have little control, may simply give up their attempts to make sense of their lives. An over-responsive environment may also create difficulties for scheme development. If the setting is "too rich" or if well-meaning parents always step in before frustration occurs, the lack of disequilibration in the child may act as an inhibitor of further development.

(c) Problems in the child/environment interaction.

In Piaget's theory, development proceeds when there is some discrepancy between the structure/function of the child and the demands posed by the physical and social environment. One of us has argued that psychopathology should not be defined as a characteristic of the child or the parents, but rather in terms of the mismatch between what is wanted and expected, and what the child is able or willing to display (Cowan, 1978). A chronic lack of correspondence between "subject" and "object" can create a chronic state of disequilibration. This state may prove threatening and anxiety provoking, and may lead to the active avoidance of further disequilibration described in disturbed children by de Ajuriaguerra (1969) and Schmid-Kitsikis (1976). In our examples Jean's repetitive application of the "make sit down" scheme may represent a refusal to disequilibrate rather than an expressed attempt to assimilate. It is also possible that Dora's recurrent "undoing" schemes may be a means of avoiding activities which will disequilibrate her by inducing accommodation.

We are aware that we have been speculating about possible antecedents of psychopathology without taking a position on how these antecendents themselves

come about. At this point we can simply state our belief that such problems as structural retardation and functional imbalance can result from biological causes, from environmental events, or more likely from a combination of the two.

Implications for clinical diagnosis and treatment

There is as yet no Piagetian diagnostic or therapeutic system, and we are not certain that there should be. Rather, it seems to us that there are two possible ways in which ideas based on the Genevan approach can inform the work of the clinician. First, the Piagetian framework can be used to interpret commonly accepted clinical practices so that they can be understood from the cognitive developmental point of view. This will help to define the areas of overlap and agreement among what often seem to be conflicting perspectives. Second, there are some ideas derived directly from Piagetian theory which may generate new ideas about how to diagnose developmental dysfunction and how to promote development in the direction of more optimal functioning.

(a) Common practices interpreted.

Most diagnostic and therapeutic approaches to children assume that the clinician must become familiar with the child's eye view of reality in order to understand his or her problems. Since diagnosis and therapy usually take place in the clinician's office rather than in vivo (some behavioral treatments are an exception) the focus is on the symbolic meanings that children attribute to internal and external events. Play is used as a medium of expression and communication because it is a central part of the child's natural language. All of these assumptions of common approaches and child diagnosis are consistent with the central tenets of Piaget's approach to understanding the child.

One of the goals of this diagnostic enterprise is to describe the child's developmental level so that treatment can be matched to that level, neither too far above nor too far below. In addition to structural matching, Piaget's equilibration theory implies that there must be functional matching as well. The overassimilative child may not initially do well with an accommodation-inducing

therapy like behavior modification. The overaccommodative child may require a gradual withdrawal of structure before he or she could manage a play therapy in which materials are primarily shaped to the child's fantasies. From the Genevan perspective, elements of both assimilative and accommodative therapies would probably provide a more optimal treatment environment, than either approach taken alone. The initial goal of therapy may be to begin where the child is, but to introduce techniques which begin to focus on the "weaker" side of the assimilation-accommodation imbalance.

(b) Ideas derived directly from Piaget.

In contrast with psychoanalytic theorists who define developmental stages affectively in terms of the child's locus of pleasure (oral, anal etc.), Piagetians define stages cognitively, in terms of the child's structure of logical transformations. While Piagetians are also concerned with affective/social development (Piaget 1981), it seems obvious that they would focus on diagnosing the child's cognitive level and on treatment strategies which would enrich the child's ability to understand and manipulate symbolic schemes.

It is our impression, based on work with severely disturbed children, that a Piagetian diagnosis reveals structural deficiencies at levels far below those expected by family and other clinicians. Ten year old autistic children, while they understand a great deal about the world, may still have difficulties with object permanence; when things or people are not in view they seem to the child to have disappeared. Psychotic children who have a highly developed use of language may be functioning at a much lower conceptual level than their language suggests. Certainly their schemes are sensori-motor in nature, showing evidence of circular reactions and a lack of symbolism. It is thus our impression that disturbed children show wide peaks and valleys in their cognitive structures, so that diagnosis is not a matter simply of labelling a child in a given stage, but providing a differentiated description of levels of functioning in different domains.

A focus on cognitive developmental diagnosis helps to define the nature of the world as seen through the child's eyes. We can obtain a clearer picture of what it is that children are understanding about the events in their lives, about their families and about the treatment. This information is useful beyond the narrowly defined cognitive realm. What children understand about the world, about causality, about the nature of inference may directly affect their feelings about things and people, and may affect their social/affective interactions as well (see Cicchetti and Pogge Hesse 1982, Cowan 1982, Sroufe 1979). For example, working with a child on understanding "what is alive" in the domain of plants and animals may facilitate development by removing the stress induced by talking about or playing out themes of a death in the family. And, if Piaget is correct in his hypothesis of an indissociable link between cognitive structure and affect (1981), progress in one area could transfer to the interpersonal areas of the child's life.

We have referred to the fact that schemes tend to be fragmented, lacking intercoordination. As in the Piagetian school program (Kamii and De Vries 1978), therapists might provide activities which encourage children to discover relationships between parts of situations between schemes and objects, and between themselves and other people.

We are suggesting, then, that in addition to searching for a dynamic interpretation of the child's play schemes, it may be useful to engage in a structural and functional analysis of these schemes from a cognitive developmental perspective. This analysis can provide the clinician with an estimate of the appropriate developmental level and the appropriate side of the assimilation-accommodation balance toward which to direct an intervention. While the clinician must ultimately provide a safe place for the child, his or her role should be defined as a disequilibrator, who attempts to help the child move toward more differentiated and integrated cognitive-affective structures for coping with the world.

TABLE I

PUBLIC SCHOOL CHILDREN	INSTITUTIONALIZED CHILDREN
1) Schemes are intercoordinated (assimilated or accommodated to each other) for the purpose of attaining an overall goal or plan	1) Schemes tend to be fragmented. Their content may also be of an "undoing" nature.
2) Schemes are modifiable and specializable.	2) Schemes tend not to be modifiable or specializable.
3) Schemes do not become overly repetitive.	3) Schemes may become extremely repetitive. This process may be coupled with mounting anxiety.
4) Alternative schemes may be used to reach a single end.	4) Alternative schemes are not generally used to reach a single end.
5) Schemes are symbolic. They may also be verbal or verbal anticipatory.	5) Schemes are sensori-motor in nature. There is evidence of circular reactions and non-attainment of certain sensori-motor acquisitions. Next to no use is made of verbal or verbal anticipatory schemes.
6) Assimilation and accommodation are relatively balanced, although one of the mechanisms may color the play.	6) Objects tend to be assimilated to schemes which in turn leads to distortion of these objects.

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